

REMARKS

Claims 1, 3, 4, 6, 9-17, 21, and 22 are now in the application. By this Amendment, claim 1 has been amended to correct an informality but not to limit the claim scope. Specifically, claim 1 has been amended to remove the claim feature “wherein” that was inadvertently added in the June 25, 2008 Amendment. In addition, a missing coma was inserted. No new matter has been added.

Entry of the amendments is respectfully requested as they merely correct informalities and do not create any new issues.

Claims 1, 3, 4, 6, 9-17, 21, and 22 have been rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,990,542 to Motani (hereinafter “Montani ‘542”) and U.S. Patent No. 5,317,033 to Motani (hereinafter “Montani ‘033”) in view of U.S. Patent No. 4,818,451 to Arai et al. or in view of U.S. Patent No. 4,912,140 to Tusim, and in further view of EP 0 915 127 to Glück et al. (hereinafter “EP ‘127”) or in further view of WO 98/51735 to Glück et al. (hereinafter “WO ‘735”).

As appreciated by the Examiner, Motani ‘542 and Motani ‘033 suggest the production of extruded foam boards, but not producing foamed beads. As such, neither Motani ‘542 nor Motani ‘033 can reasonably be considered to suggest features corresponding to “cutting of the polymer melt comprising blowing agent downstream of the die at reduced pressure with foaming to give foam beads,” as recited in independent claims 1 and 22. However, the Office Action relies on EP ‘127 and on WO ‘735 for curing the deficiencies of Motani ‘542 and Motani ‘033.

Applicants respectfully submit that the production of foam boards and the production of foamed beads are two distinct processes that differ in more than just the shape of the resulting products. In the foam board extrusion process (XPS), hot polystyrene melt is extruded under pressure and foaming occurs within a fraction of a second after exiting the die and cooling. In the bead molding process, expandable polystyrene (EPS) is pre-foamed by heating with air or steam.

It takes several minutes for softening of the EPS-particles to occur and to produce the foam particles by evaporation of the low-boiling blowing agent. The totally different foaming processes result in dramatically different cell structures, which are important for the insulation and mechanical properties. In the XPS-process no heated air or steam is used. The extrusion foamed board is also not further expanded or molded by heated air or steam. Therefore the two processes are so different, that a person skilled in the art has no motivation to combine a citation directed to XPG with a citation directed to EPS.

Further, the proposed modification in the Office Action would render Motani '033 (or Motani '542) unsuitable for its intended purpose. Motani '033 suggests, at col. 9, lines 8-17, that a foam is extruded to plate-like materials having a thickness of at least 10 mm. These plate like materials are obtained by extruding the polystyrene mixture into space under atmospheric pressure through a slit with a clearance of 2.0 mm resulting in a plate having a thickness of 40 to 60 mm. Motani '542 suggests similar features at col. 9, lines 40-46. EP '127 teaches, at paragraph [0044], that a melt is pressed through a nozzle having a diameter of 0.8 mm resulting in beads having a diameter of 1.5 mm. WO '735 teaches similar features at page 10, lines 38 to page 11, line 2. As set forth above, the extrusion step has a significant impact on the cell structures of the foamed beads. Thus, it is by no means certain the proposed combination in the Office Action would result in useful materials. However, assuming that the citations can be combined in the manner suggested, the proposed combination would render Motani '033 unsuitable for its intended purpose. Specifically, Motani '033 suggests, at Fig. 1, and at col. 10, lines 59-65, foam plates having two different sizes of cells, one size being at most 0.3 mm and the other cell size being 0.4 to 1 mm. Similar features are suggested in Motani '542. At col. 8, lines 17-26, Motani '033 suggests that the large cell sized form individual islands separated by a sea of small cells. This particular structure is believed to provide the heat insulating properties to the foamed boards of Motani '033. By using the polymer mixture of Motani '033 with the extrusion process of EP '127, wherein the large cells are of the same size as the nozzles taught in EP '127, it would not be possible to exclusively obtain beads wherein 1 mm cells are surrounded by 0.3 mm cells such that the large cells are islands separated by a sea of small cells. Instead, a large fraction of the beads produced in this hypothetical process would consist of beads wherein

large cells are located at the surface. Accordingly, if those beads are fused, for example to manufacture a board, large cells would not be separated by small cells and instead would be fused directly together.

Thus, as set forth in MPEP §2143.01 V, “[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.” *In re Gordon*, 733F.2d 900 (Fed. Cir. 1984). Thus, Motani ‘033 or Motani ‘524 may not be combined with EP ‘735 or WO ‘735 and the rejection necessarily fails.

The Office Action relies on Arai and on Tusimi for suggesting obtaining pre-expanded beads in one step. However, Arai and Tusim fail to cure the deficiencies of Motani ‘033 and Motani ‘524 discussed above.

In an alternative to the above rejection, the Office Action asserts that a skilled artisan would have been motivated to combine a blowing agent containing water, alcohol, and an absorber, as suggested in Motani ‘033 or Motani ‘542, with the extrusion process taught in EP ‘127 or WO ‘735 because it would result in improved flexural properties.

As set forth above, EP ‘127 or WO ‘735 teach a foam bead extrusion process. Both Motani citations are directed to a method of producing foam boards, which have certain flexural properties. A skilled artisan would not be motivated to modify EP ‘127 or WO ‘735 by using the cell control agents suggested in the Motani citations to improve the flexural properties of foam beads. Further, as set forth above, the cell structure and therefore the mechanical properties of extruded polymers depend to a large extent on the extrusion process. Thus, going from the slits with a clearance of 2.0 mm suggested in Motani to the nozzles with a diameter of 0.8 mm taught in EP ‘127 or WO ‘735 changes the cell structure and, therefore, the mechanical properties. Specifically, the cell structure suggested in Motani is, in part, a result of the specific extrusion process. Accordingly, there is no reasonable expectation of success that the proposed modification would bestow any benefit to the completely different process taught in EP ‘127 or WO ‘735.

Further, even if it was permissible to modify the references as suggested, the Office Action has used impermissible hindsight reasoning in manufacturing its rejection of the claims.

Focusing on the obviousness of substitutions or differences is improper; rather, the claimed invention must be considered as a whole. *Gillette Co. v. S.C. Johnson & Son Inc.*, 919 F.2d 720, 724 (Fed. Cir. 1990). Moreover, it is impermissible simply to engage in a hindsight reconstruction of the claimed invention, using the patent as the template and selecting elements from references to fill the gaps. E.g., *In re Rouffet*, 149 F.3d 1350, 1358 (Fed. Cir. 1998), citing *In re Gorman*, 933 F.2d 982, 986 (Fed. Cir. 1991), citing in turn *Interconnect Planning Corp. v. Feil*, 774 F.2d 1132, 1143 (Fed. Cir. 1985).

Simply because claim features may be known in the art is insufficient for a finding of obviousness. “[A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art.” *KSR Int’l v. Teleflex Inc.* 127 S. Ct. 1727, 1731 (2007). Rather, there must be a well reasoned or articulated rationale to combine the references or “something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.” E.g., *Rouffet* 149 F.3d at 1356, and the cases cited therein. See also *In re Fulton*, 391 F.3d 1195, 1200 (Fed. Cir. 2004), citing *Rouffet*; *Sibia Neurosciences*, 225 F.3d at 1356; *ATD Corp. v. Lydall, Inc.*, 159 F.3d 534, 546 (Fed. Cir. 1998). As variously stated by the Federal Circuit, there must be some reason, teaching, suggestion, interference, motivation, or incentive in the prior art to make the selections made by the inventor and combine the prior art to produce the claimed invention. E.g., *Rouffet*, 149 F.3d at 1355; *Pro-Mold and Tool Co. v. Great Lakes Plastics Inc.*, 75 F.3d 1568, 1573 (Fed. Cir. 1996); *Gorman*, 933 F.2d at 986-987; and *Ashland Oil, Inc. v. Delta Resins & Refractories, Inc.*, 776 F.2d 281, 297 n.24 (Fed. Cir. 1985), *cert. denied*, 475 U.S. 1017 (1986). Further, a motivation to combine only flows from the combination that is, on balance, desirable, not merely feasible. See *In re Fulton*, 391 F.3d at 1200, citing *Winner Int’l Royalty Corp. v. Wang*, 202 F.3d 1340, 1349 (Fed. Cir. 2000). As explained by the *Winner Int’l Royalty Corp.* court, “[t]rade-offs often concern what is feasible not what is, on balance, desirable. Motivation to combine requires the latter.”

The United States Supreme Court, in *KSR Int'l*, 127 S. Ct. at 1740-41, cited with approval the Federal Circuit's reasoning that "rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Accordingly, even if the references could somehow be interpreted to together teach all of the features of the claimed subject matter, the Office Action failed to provide a proper rationale as to why a skilled artisan would have combined Motani '033, Motani '542, Arai, Tusim, EP '127, and WO '735 to achieve the presently claimed subject matter.

The reasons set forth in the Office Action are insufficient to explain why a skilled artisan would have been motivated to combine the applied references in the asserted matter. The Office Action asserts that one having ordinary skill in the art would have been motivated to combine the references because the combination would result in a composition with a desired shape. However, as discussed above, the properties of a foamed bead do not primarily depend on the shape of the products but on the chemical compositions of the material in combination with the extrusion process. In particular the foaming process determines the cell structure, which has a large impact on the mechanical properties of the products thus obtained.

Claims 7, 8, and 18-20 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Motani '033 or Motani '542 in view of Arai or in view of Tusim, and in further view of EP '127 or in further view of WO '735 and in further view of U.S. Patent No. 4,585,825 to Wesselmann.

As acknowledged in the Office Action Motani '033, Motani '542, Arai, Tusim, EP '127, and WO '735 cannot reasonably be considered to suggest a bi- or multimodal molecular weight distribution or a polydispersity M_w/M_n of at least 2.5. The Office Action relies on Wesselmann for support of these claim features of claims 7, 8, or 18-20.

Wesselmann suggests monovinylidene aromatic polymer compositions for molding resins. Wesselmann does not suggest thermoplastic polymer foams and gives no indication how

the molecular weight distribution of the polymer affects the foaming process or any foam characteristics. Applicants note that the foam structure and the resulting mechanical properties are largely influenced by the foaming process.

There is no indication in Wesselmann how the polymer structure would affect foam beads. In particular, as set forth in Applicants' disclosure at page 2, line 42 to page 3, line 10, the claimed subject matter allows for the production of particularly low bulk densities. Such a benefit was not predictable by the unrelated disclosure of Wesselmann.

In view of the above amendment, applicant believes the pending application is in condition for allowance.

Applicants concurrently herewith submit the requisite fee for a one-month Extension of time. Applicants believe no additional fee is due with this response. However, if any such additional fee is due, please charge our Deposit Account No. 22-0185, under Order No. 12810-00034-US from which the undersigned is authorized to draw.

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Respectfully submitted,

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